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PUERPERAL MASTITIS.

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Inflammation of the breast of the nursing woman is a subject deserving our careful consideration for many reasons, not the least of which is the great difference of opinion regarding its real pathogenesis and treatment.

Striking diversity of opinion concerning the treatment of any disease is often due to the fact that different phases of the same morbid process require widely different methods in their cure, and hence often arise the apparently irreconcilable views of authors of equal note, and the disputes of those who take part in the discussion of a medical essay.

With a view, then, to present the subject in hand as clearly as possible, it will be considered with such regard for the anatomical features, pathological processes and therapeutical indications involved, as is compatible with the scope of a necessarily brief paper.

The mammæ belong to the class of racemose, or grape-like glands. At their inferior surface they are separated from the pectoral muscles by a thin layer of superficial fascia. The nipples are covered by wrinkled skin provided with numerous papillæ; they are perforated at the tip by foramina, from ten to twenty in number, which are the openings of the tubuli galactophori. Near the base of each nipple, and upon the areola, there are a number of rounded elevations, indicating the presence of small sebacious glands, the glandulæ aberrantes of Montgomery, whose function it is to secrete an unctuous substance intended to protect the integument of the nipple during nursing. The tubuli galactophori are lined with mucous membrane which is continuous with the integument at the summit of the nipple; at this point the cells are of the tessellated variety; deeper in the gland they are of the columnar form. Each one of these tubules serves to discharge the secretion of its own gland; in other words, the mamma is not a single gland, but is composed of as many glands as there are tubules in the nipple, and each gland is histologically distinct from the others. Following the course of a single tubule, or duct, from the nipple inward, it is observed that it dilates at a point near the base of the nipple, forming an ampulla for the temporary accumulation of the milk during nursing. Beyond this point of dilatation the duct narrows,

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and dividing and subdividing at frequent intervals it terminates at last in the glandular vesicles or acini.

The stroma of the gland consists of connective tissue designated according to its position, as the peri-lobular or peri-acinous connective tissue, which is in connection with the subcutaneous connective tissue, and like the latter has imbedded in it much adipose tissue; but beneath the areola there is no fat.

At the beginning of lactation the alveoli of the glands become distended with a clear secretion; fat globules appear in the cells and in the fluid contents of the alveoli; then the cells enlarge, assuming a cubical or columnar form, and begin to divide and accumulate in the interior of the alveoli. The milk appears to be formed by the breaking down of these cells; the fat cells become suspended in the fluid contents of the alveoli as milk globules, while the albuminous constituents of the cells form the proteid substances of the milk; the fluid constituents are derived from the serum of the blood.

Mastitis not infrequently occurs in the new-born, both sexes being equally susceptible to the disease. Its importance at this period is chiefly due to the fact that it sometimes prevents suitable development of the breast, or at least the nipple, in the adult woman. A subacute mastitis is frequently observed at the period of puberty, likewise in both sexes, at which time, also, a slight secretion of milk may take place. Pregnant women occasionally develop a moderate mastitis, but by far the greatest number of cases occur during the puerperium, and it is further observable that it occurs most frequently at the beginning of lactation, during the first month especially, although it may appear much later.

Chronic mastitis is a rare, though very troublesome disease, which need not occupy our attention at this time.

Following parturition there are, of course, marked circulatory changes. There is a lessened demand for blood on the part of the uterus and a corresponding determination toward the breasts. These organs soon take on great functional activity; they become turgid, hard and sensitive, and the bodily temperature is more or less increased. In a day or two more the breasts become softer and the normal flow of milk is established.

There is a considerable difference of opinion existing as regards the cause or causes of inflammation of the breasts, but there are a number of interesting facts observable which are worthy of note. Mastitis occurs more frequently in primiparæ than in multiparæ; more frequently in the woman who nurses her child than in the one who does not; it occurs oftener in the right, the smaller, than in the left breast; the lower and outer portion of the breast is the part most fre-

quently affected; it seldom affects both breasts; it is of most frequent occurrence during the first month of lactation, and especially during the latter half of this period; the next period of relative frequency is said to be toward the end of lactation, especially when the mother unduly protracts the function of lactation, often in the hope of preventing conception.

There are three varieties of mastitis: 1st, parenchematous or true mastitis; 2d, retro-glandular or sub-glandular mastitis; and 3d, subcutaneous mastitis. Of these the first variety is by far the most common. The third variety, the subcutaneous, does not often affect the periphery of the breast, but is of most common occurrence in the areola or near it.

The symptoms of mastitis are easily recognizable for the most part. They consist of rigors, chills and fever, as in the case of inflammation in other parts of the body. The breast becomes swollen and lumpy, the skin tense and shiny, the tissues œdematous—unless the inflammation is deep-seated as in the sub-glandular form. Nursing is accompanied with great pain in most cases. In the sub-glandular form it may be difficult to locate the inflammation at first, but soon the great prominence of the breast, which is lifted up from the chest wall, reveals the seat of trouble. If left to itself fluctuation is manifested in from 5-15 days when the abscess finally discharges. It generally does this through an opening or openings of insufficient size, and meanwhile the inflammatory process has had time to extend in all directions, creeping from gland to gland until perhaps the entire breast has become riddled with fistulæ and the glandular structures well nigh destroyed. In neglected cases of the sub-glandular form, very destructive changes may take place, cases having even been observed in which the inflammation extended to the underlying muscular structures and the periosteum of the ribs, the course extending over long periods until the patients became greatly impaired in health.

As in the case of many other diseases, all manner of fanciful and plausible, probable and improbable causes, have been cited to account for the phenomena of mastitis. It is curious to observe, for instance, that the vulgar French term for the disease, "poil," meaning hair, is derived from a belief prevalent at the time of Aristotle, that if a woman chance to swallow a hair while drinking, it is likely to become lodged in a milk duct, and thus cause obstruction and consequent inflammation. In our own language we have the vulgar term "weed," the origin of which, however, is not so clear, though it has been thought to come from the Saxon word wedan, meaning "to rage."

According to the older opinions of physicians and the popular ones still entertained by nurses and patients, mastitis is the result of

"caking" of the breast from obstruction to the flow of milk, which is supposed to be caused by exposure to cold, by trauma, by fright, etc. Modern pathologists, believing, as they do, that all forms of inflammation are of bacterial origin, assign microbic infection as the sole cause of the disease. Modern obstetricians, admitting the truth of this, for the most part, find the atrium of infection in lesions of the nipple, and trace the source of the infection to the child's mouth, to the lochial discharge, or to some fore-cloth used in wiping off the nipple; in short, if we abandon the old idea of idiopathic inflammations we must confine our attention to the bacteria, and ascertain the avenues through which they make their entrance into the body. It is believed by some that the bacteria make their way to the acini by means of the milk ducts, although it is difficult to understand how they can advance in the face of the opposing current of milk.

The most general belief is that the microbes gain entrance through the lymphatic vessels of the nipple. It is easy to understand how this may be when we remember that the surface of the nipple is rendered rough and uneven by the numerous papillæ with which it is beset, and that the skin is very delicate between the papillæ and at the base of the nipple, at which point the fissures, when they exist, are usually found. The delicate cuticle in these localities may readily become macerated by the colostrum during pregnancy, and later on by the milk and by the saliva of the nursing child. We can easily comprehend that infection may take place through a denuded spot so small as to defy discovery, even during a very careful examination. It has been thought by some that obstruction of one or more milk ducts causing distension of the breast with milk, is the principal cause of mastitis, but it is much more probable that the retention of milk is merely the result of the antecedent inflammation.

Kolb's description of the intimate pathological changes involved is as follows: "The affected parts seem hard and usually form nodular tumors, section of which shows them to be distended with milk; the glandular tissue is hyperæmic and very succulent. In the acini small extravasations of blood the size of a pin's head may be seen. As a rule, suppuration occurs early, and it appears to me, indeed, to be a connective tissue suppuration; at least I could not discover anything in such cases which would indicate an epithelial suppuration. Pus appears at first in the acini, partly fluid, partly not, and as it seems to me, most frequently with fibrous intercellular substance, so that we find in the grouped acini heaps of yellowish, fibrinous plugs, analogous to those found in croupous pneumonia. Destruction soon overtakes the finer inter-acinous tissue, the small purulent foci coalesce, forming larger ones, the pus becomes fluid and a true mammary abscess is formed. The

cavity of this abscess never has a smooth wall, but the membrane is rough and not infrequently nodular and ragged particles of broken-down gland tissue are found projecting from it."

In supra-glandular mastitis, the inflammatory process begins in the areola, generally in the glands of Montgomery; the inflammation is generally confined to the connective tissue and is not so apt to be extensive as in the parenchematous form.

In the sub-glandular form, whether the gland tissue is first affected or not, it is said to be always involved in the abscess formation.

It is of interest to observe that the manner in which the tissues are involved may influence the character and the position of the abscess. Thus, Cheyne states that in mastitis the abscesses which are caused by the staphylococci always begin in the deeper parts of the breast and extend toward the surface, because the microbes enter the breast through the milk ducts. On the other hand, the streptococci enter the tissues through superficial abrasions and make their way along the lymphatics, their pathogenic action being first manifested at the surface. Bumm found in the walls of a developing abscess of the breast staphylococci which had located in the interior of the acini and had penetrated thence to the inter-acinous connective tissue.

It is believed by some writers that bacteria can gain entrance to the body and circulate in the blood by passing through intact mucus membrane, just as particles of inorganic matter do. Further, it is believed that pathogenic germs may exist in the blood without giving rise to constitutional disturbance. In such a condition, however, a local injury or a marked diminution of vital resistance in the cells, supplying what is called, for want of a better term, a locus minoris resistentiæ, suffices to start up inflammatory action. Such action has been experimentally produced in the lower animals, and hence arises the theory that so-called idiopathic inflammation in the human subject may arise in this manner. It is possible, then, that mastitis may occur in patients with intact nipples. In surgery it is claimed that a locus minoris resistentiæ may be supplied by hemorrhage, necrosis, by pyæmia, fractures, imperfect digestion, enfeebled circulation and respiration, and by irregular distribution of the blood resulting from exposure to cold. This serves to locate the infective microbes, for all conditions that impair cell nutrition favor suppuration. Hence, in the case of mastitis, it is conceivable that infection may similarly take place, the hyperæmic condition of the breast furnishing the required locus minoris resistentiæ.

The methods of treatment advocated in the cure of mastitis are of course very numerous. They include the ordinary antiphlogistic remedies, such as cold, quinine, opium, tartar emetic, aconite, digitalis,

ipecac. Phytolacca decandra is highly esteemed by some physicians; its common name, garget weed, is derived from its supposed virtues in the cure of garget or inflammation of the udder of the cow. Aside from these remedies many prophylactic measures are in vogue, having for their main object the retardation of the milk secretion. The problem of treatment resolves itself to this question: What shall we do to prevent suppuration, and how shall we treat a case after suppuration has occurred?

The nipple should be prepared for nursing by hardening its tissues with astringent applications, such as tannin, alum, etc. I have found an ointment of the tannate of lead a useful application. The child should be put to the breast early and at as regular intervals as possible. The greatest care should be taken to keep the nipples in an aseptic condition. When the breasts first become engorged, the proper secretion of milk seems to be facilitated by gentle rubbing with oil in a direction from the periphery of the breast toward the nipple. When inflammation is threatened and it appears desirable to limit the secretion of milk, it is well to make applications of belladonna in some form, preferably a solution of atropia in the strength of one to two grains to the ounce of water or glycerine.

During recent years the treatment by compression has occupied much attention. Thomas and Mundé affirm "that there can be no question that any acute case of puerperal mastitis can be checked in its early stages by the complete cessation of the function of lactation, and the uniform compression of the affected organ. This compression should be continued until all pain and fever has subsided, the bandage not being changed for several days, or, if removed, immediately replaced." A great deal of attention was directed to this method of treatment by Dr. P. A. Harris, in 1881. "Having discovered," he says, "the existence of any inflammatory movement in the breast, of any grade of severity or any stage of advancement short of the formation of an abscess, I should at once interdict nursing, friction, pumping, the application of fomentations; in fact, every local measure excepting such as are calculated to secure complete rest for the gland; rest from passive motion, rest from secretion, and rest from pain." This compression he secures by means of cotton wool, cotton batting, and a roller bandage.

Grandin states that this method was in use in the New York Maternity Hospital at the time Harris' paper was published, and that under its uniform use at this institution surgical interference of the puerperal breast is never required. Garrigues says that if mastitis is caused by the entrance of microbes into the lactiferous ducts and consequent fermentation of the milk and secondary inflammation of the

connective tissues, it is evident that this process is favored by the stagnation of the milk in the ducts and is counteracted by its removal. In substantiation of this view, he points to the result of the treatment used in the New York Maternity Hospital, where for years he has seen but a single case of mammary abscess. The entire treatment, he says, consists "in the application of tannic acid to sore nipples, even compression of the breasts, their depletion by sucking babies or by the fingers of the nurse, and occasionally an ice-bag." "If that treatment," he says further, "can prevent the formation of mammary abscesses, the infection cannot be a very dangerous one and the corpus delicti must be found in the lactiferous ducts." Garrigues finds further confirmation of his theory of infection, in the fact that he has much better success in preventing mastitis in hospital than in private practice, the difference being ascribed by him solely to the superior skill of his head-nurse in the hospital; for even when in private practice he employs nurses who were trained by this head-nurse in the hospital, he fails to secure the best results and his patients occasionally develop abscesses. The compression is secured by a simple jacket bandage, made of ordinary unbleached muslin. This bandage is applied to all patients, and is kept in place from the time the breasts begin to fill until the ninth day. In nursing women the breasts are kept empty by one or more babies, unless the nipples become too sore, in which case nursing is temporarily discontinued and the breasts are milked out by the nurse's fingers. If swelling, redness, pain and fever supervene, an ice-bag is applied outside of the binder.

These, in general, appear to me to be the best methods of treatment for the prevention of mammary abscess. As regards, however, the plan of tight bandaging, there is a modification which deserves a special mention. This is one that has been recommended to hasten healing after incision of a mammary abscess; it is described in Gross' Surgery and Parvin's Obstetrics, and may be made, I think, to subserve an equally useful purpose when we are attempting to cure without resort to surgical measures. The plan consists in making use of a large sponge which has been subjected to powerful compression. This is applied to the breast, secured by a firm bandage, and then gradually wetted. The swelling of the moistened sponge results in an evenly distributed pressure which can scarcely be equalled in efficiency by any mere compression produced by an inelastic bandage.

My own observations of mastitis have been confined mainly to cases that required surgical treatment, and most of these were in patients whom I did not see until the inflammation was well advanced; others were cases that were ready for the evacuation of pus when I first saw them, and others still, were cases in which the abscesses

had already been opened. Accordingly, I have not had much opportunity to get the best results obtainable by early bandaging in cases of threatened abscess. I have tried this method a number of times, however, but generally without success in preventing abscesses, although pus formation was markedly retarded thereby. My failures supply no arguments against the efficiency of bandaging, because, as I have said, this expedient was not employed early enough. I do not recall a single case where pus formation was prevented after induration, tumefaction and reddening of the skin had occurred. Where these manifestations were present and I adopted abortive measures, pus formation was hindered for a time, indeed, and the patient remained for some days in a very uncomfortable condition, being tormented with chills, fever and pain until I abandoned prophylactic treatment and endeavored to hasten pus formation, when I was often surprised at the rapidity with which the latter took place. I recall one case that illustrates these points well. The patient, a very intelligent lady, began to suffer from pain in the right breast about two weeks after her fourth confinement. In the absence of the physician who attended her in her confinement, I was called in. I found that she had been having pain and chills for several days. For three or four days she had been applying a miniature poultice, generally cold. The skin was red over a small area. I ordered a better system of poulticing and in two days opened a moderate sized abscess near the nipple, which healed in a few days more. Before healing was completed the patient complained of pain in the other breast. Nursing was discontinued, the chest was tightly bandaged and belladonna was applied. At this juncture her own physician returned and resumed charge of the case. I learned subsequently that a small abscess formed in a few days and was opened by the knife.

The surgical treatment of mastitis should be conducted with due regard for asepsis. The plan of opening the abscess described by Lister a number of years ago, and still recommended by Playfair as the very best one, consists in making the incision under cover of a rag soaked in carbolized oil. In dressing the wound great care is taken to expose it but a few seconds, and after it is cleansed it is instantly covered by a layer of antisepticized glazier's putty spread on tin-foil. This is certainly a cumbersome method, and one that offers no advantage over the present methods in daily use by our surgeons.

But there is another point upon which I wish to lay very special emphasis, as I find no mention made of it by the obstetrical writers, except in connection with cases of chronic mastitis. It is this: it does not suffice to merely incise an abscess of the breast and treat it as is done with ordinary abscesses in other localities of the body. The

anatomical construction of the breast is such as to afford the pus unusual opportunity to burrow in the tissues, so that it is not uncommon, but rather the rule, to find numerous small pockets of pus separated from each other by walls of connective tissue. Unless these walls are carefully broken down so as to leave a single abscess cavity, and unless perfect drainage is provided for it, the obstetrician cannot reasonably expect a rapid healing. Another point still, as stated by Senn, is of considerable importance: the lining of the walls of abscesses remains infected with microbes after incision and drainage, so that a limited suppuration takes place even in the most favorable cases. I have therefore found it well to scrape these walls with a curette at the time of the operation.

As the existence and location of pus pockets cannot readily be determined, I always make an incision large enough for the introduction of a finger, which I employ to break down the connective tissue partitions referred to. The extent to which inflammatory action may spread in the breast, and the difficulty that one may find in limiting it, is illustrated in the following cases: The first was that of a primipara. An abscess had formed at the outer aspect of the left breast, and had been opened by the knife and drained. About a week later I saw her for the first time, and found that chills, fever and suppuration were still active, and that she was getting weak and anæmic. I enlarged the opening, broke down the loose connective tissue with my finger, and made a new opening for drainage in a more dependent point. Healing took place rapidly. In the second case the patient, a primipara, developed a severe mastitis about three weeks after confinement, and her physician made two incisions within a few days and drained. Suppuration and fever continuing in almost undiminished form, I saw her with the physician in charge. We enlarged the openings, connected the two cavities, cleaned them out thoroughly, and the patient soon recovered. In the third case I had discharged the patient, a primipara, ten days after confinement. A week later she complained to her nurse of pain in the breast, and said she feared the breast was "caking." The nurse assured her that it was all a matter of the imagination, and that she would have no trouble if she dismissed the matter from her mind. I was called about a week after the nurse left and found the right breast hard, moderately tender on pressure, and exhibiting a diffused area of redness over its lower and inner aspects. I ordered poultices, and in three days, finding the abscess pointing at the most dependent part of the breast, made an incision here, and broke down as much loose connective tissue as I could. Observing that the area of redness and swelling extended beyond the limits of the pus cavity toward the upper and inner aspect of the

breast, I endeavored to penetrate this part with my finger, but the tissues felt entirely healthy, and were so firm that I was unable to do so. Healing took place very rapidly at first, and nothing remained of the cavity in a few days except a narrow sinus; but the redness and swelling continued in the locality referred to. Hoping that pus from this region would soon escape through the original opening, and being loath to urge another incision, I ordered a renewal of poulticing. This was continued for two days. On the third day I visited the patient prepared to evacuate pus by extending the limits of the first incision subcutaneously, but found that the pus had already made its way through the sinus. Healing took place in a satisfactory manner, but about a week later I called the patient's attention to a "caked" appearance at the opposite side of the breast, as far removed as possible from the seat of the original inflammation. I had poultices applied, and in three days opened a very large abscess which had no apparent communication with that of the other side. Recovery took place rapidly. In this patient, although the manifestations were those of severe and extensive inflammation, it was noticeable that there was but little pain present; the nipple, too, was neither fissured nor painful. The patient did not entirely abandon nursing during the period of suppuration, and continued to nurse her child after the evacuation of the last abscess, the injured breast yielding nearly as much milk as the other one.

In a case in which a small but very painful abscess formed in a primipara during the twelfth month of lactation, I was unable to find any lesion in the nipple, which was not even tender, and ascribed the infection to scratches inflicted upon the breast by the nails of the vigorous child. The breast was badly marked by these scratches, and I believe the infection took place through one of Montgomery's glands.

I recently learned of a case somewhat similar to the last one mentioned. The patient was a primipara at whose accouchement I assisted. About ten weeks after the birth of her child a tender spot appeared near the nipple and within the areola. Poultices were applied by the nurse for a day or two, after which she opened a little superficial abscess about the size of a pea. There had been no trouble with the nipple itself, and infection doubtless took place in and was confined to one of Montgomery's glands.

I believe it good practice to bandage firmly after opening abscesses of the breast, but I have found no difficulty in securing prompt healing after thorough evacuation and drainage.

I have kept no records of the cases of mastitis that I have treated, and even if I were to report the others they would merely serve to strengthen the points of treatment that I have already recommended.

In conclusion, I wish to say that I find comparatively few first-rate nurses for obstetrical cases, and I find them often lacking in proper attentions given to the breast. The majority of cases of mastitis develop after we discharge our patients, but before the nurse is dismissed. If our attention were more promptly directed to threatened mastitis by the nurse, I believe there would be fewer cases of abscess to treat.

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